DRAFT

New Mexico Air Quality Bureau

Surrounding Source Format and Options

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1.0 INTRODUCTION

This document provides information regarding how to retrieve and use surrounding source inventory for air dispersion modeling for the State of New Mexico Environment Department. This document acts as a supplement to the modeling guidelines.

2.0 OBTAINING EMISSIONS DATA

Surrounding source data can be acquired either by requesting the data from the Bureau or by downloading the MergeMaster database from the web page and retrieving it yourself. The procedure for each follows.

2.1 Retrieving data from MergeMaster

Software requirements:
MS Access 2000 or later version of Access is required to use MergeMaster.

Obtain MergeMaster from the Bureau as follows

Find MergeMaster (emissions inventory database) on the web page or ftp site and download it.

Extract/unzip the mdb file to a location where you can find it. Do not open the database directly from WinZip because the file will then be read-only and will not operate properly.

Open MergeMaster with MS Access.

Retrieve the sources from MergeMaster

Enter the facility name at the top of the form (preferably in a new record)
Enter the UTM coordinates and UTM zone in the appropriate fields.
Press the "Retrieve Surrounding Sources" button.
A form will appear with the following default information.

- UTM coordinates specified in the previous form.
- 65 km default retrieval radius.
- Air Quality Control Region (AQCR) based on the UTM coordinates.
- PSD minor source baseline dates for that AQCR (if established).
- A list of pollutants to be retrieved (with check marks if the baseline date applies).

Delete the pollutants you are not interested in by selecting the record at the grey bar to the left of the pollutant name and hitting the delete key. All the pollutants remaining will be retrieved.
Press the "Retrieve Surrounding Sources" button.
Specify the name of a new folder to put the data into.
MS Excel files containing the data retrievals will be placed in that folder.
If you need any help please contact Eric Peters. Eric.Peters@state.nm.us

2.2 Requesting Data Directly from the Bureau

To request data from the Bureau, send an e-mail to one of the following addresses:
Eric.Peters@state.nm.us
Sufi.Mustafa@state.nm.us

Include the following information in the request:

UTM coordinates and UTM zone of the center of the modeling domain (typically the center of the facility).

The Bureau will provide the following information, unless otherwise requested:

All sources within 65 km of the center provided in the request.

The following pollutants will be provided: NO_2, CO, PM10, TSP, SO_2, and H_2S.

PSD Increment expanding emissions will also be provided, if the minor source baseline date has been established at that location.

2.3 Data From Other States

If you are modeling an area within 65 km of a state line, surrounding sources from other states may be required. The Bureau can provide some data for neighboring states, but the applicant is responsible for verifying any missing data with the other states.

Colorado sources are currently incorporated into MergeMaster, but they may not be up to date and PSD increment information may be incorrect.

3.0 DATA FORMAT

3.1 File Format

Files provided by the Bureau or exported by MergeMaster are in Microsoft Excel (97 to 2000) format.

3.2 File Names

File names begin with "Neighboring_", followed by the pollutant abbreviation and then the type of modeling to be done with that group.

Examples:

"Neighboring_CO_NAAQS_Sources.xls" contains carbon monoxide emissions to be used for NAAQS and/or NMAAQS modeling.

"Neighboring_NO2_PSD_Increment_Sources.xls" contains emissions of oxides of nitrogen to be used for PSD increment analysis.

3.3 Fields and units

Table 1 describes the fields and units of the data in the Exported Excel files.

Table 1: Data Format and Description.

Field name	Units	Description
MASTER_AI_ID	N/A	TEMPO ID of facility
SUBJECT_ITEM_CATEGORY_CODE	N/A	Source category identifier
SUBJECT_ITEM_ID	N/A	TEMPO ID of item
SUBJECT_ITEM_TYPE_CODE	N/A	TEMPO item description
SUBJECT_ITEM_DESIGNATION	N/A	Optional item name
SUBJECT_ITEM_DESC	N/A	Item description
LATITUDE_DEC_DEGREES	Decimal degrees	Latitude of item
LONGITUDE_DEC_DEGREES	Decimal degrees	Longitude of item
MASTER_AI_NAME	N/A	Facility name
MASTER_ORG_NAME	N/A	Company name
Zone	N/A	UTM zone
UTMH(m)	meters	UTM easting
UTMV(m)	meters	UTM northing
Elevation	meters	Elevation of base of source
STACK_HEIGHT	meters	Height of stack
TEMPERATURE	Kelvins	Exit gas temperature of stack
STACK_VELOCITY	m/s	Exit gas velocity of stack
STACK_DIAMETER	meters	Diameter of stack
Stack_Type	N/A	Type of stack (vertical, horizontal, fugitive, etc.)
Distance	km	Distance from this facility to center of domain
HrsPerYear	hours/year	Allowable hours of operation
EmissionRate_lbh	pounds/hour	Emission rate (short term)
EmissionRate_TY	tons/year	Emission rate (long term)
SIC_CODE	N/A	Standard Industrial Classification Code
SCC_CODE	N/A	SCC

3.4 Notes

Short-term emission rates ("EmissionRate_lbh") should be used in modeling. Long-term rates are available for QA purposes only.

Emissions designated as NO_2 are actually total oxides of nitrogen (NO_X).

Depending upon the geographic location, emission inventories can change rapidly; please consult with the Bureau if there is a significant time lag (more than 2 months) between the time the retrieval is prepared and the submittal of the analysis.

4.0 DEALING WITH ERRORS

Please contact the Bureau if you see "suspicious" data in the inventory. We know that there are errors in our database and we would like to correct them.

4.1 Find the error

If you find a piece of equipment that has unusual stack parameters, please follow the following procedure to handle the error.

4.2 Document the error

Please document the reason the error is suspected. Please include MASTER_AI_ID, SUBJECT_ITEM_CATEGORY_CODE, and SUBJECT_ITEM_ID in the documentation.

Examples:

> "My company owns this facility and the emission rate is wrong. The correct rate is 4 lb/hr".
>
> "Supersonic exit velocity is physically impossible for this type of engine. I have no further information."
>
> "I am modeling a surrounding source that produces concentrations high above standards all by itself. The AI ID of the source is 999 and the name is SuperBlower. I called the facility and they have shut down."

4.3 Report the Error

Send the documentation of the error to Joe Kimbrell. (Joseph.Kimbrell@state.nm.us)
Also document the error and what changes were made in the modeling in the modeling report.

4.4 Replacing Missing Values Of Emissions Inventory Sources

For compressor stations, the following default values may be used to replace missing data:
Stack height = 7.6 m
Temperature = 697 K
Exit Velocity = 32.6 m/s
Diameter = 0.3 m

For diesel generators at asphalt and crushing plants, the following default values may be used to replace missing data:
Stack height = 1.82 m = 6 ft
Temperature = 650 K = 710.3 ^{o}F
Exit Velocity = 18.1 m/s = 59.4 ft/s
Diameter = 0.3 m = 1 ft

5.0 APPLYING THE DATA

After checking for obvious errors, data from the Excel spreadsheets must be imported into the model. Proceedure for importing data depends on if a graphical interface is used or if the model is used directly.

5.1 Pasting the data into a Graphical User Interface (GUI)

These instructions are for modelers using such programs as BEEST, Breeze, or ISC-View.

Arrange the columns in a matching order in the excel spreadsheet to paste into the model.
Add a Source ID column at the proper location and create a unique identifier for each source.
Copy and paste the data into the GUI as point sources.
Note: Some GUI programs may crash if too many sources are pasted at once.

5.1 Creating a Text Input File

Converting the Excel files into properly formatted text files can take some manipulation. Detailed instructions would be too lengthy to print here. Direct export from MergeMaster to formatted text files may be available at some point in the future.

6.0 SPEEDING UP THE MODEL

Most models will run more quickly with fewer sources. However, merging sources takes time for performing the merging and for quality assurance, and may decrease the accuracy of the model. Combining stacks at a single facility is allowed only if the stack with the worst dispersion characteristics is used as the merging stack. Combining sources spatially locates the sources at a single point, which also tends to increase predicted concentrations.

In general, the Bureau is under the impression that merging sources uses more time than it saves for most models at current computer speeds. However, options for merging and discarding sources are discussed below.

6.1 Discarding Surrounding Sources.

Surrounding sources with small emission rates may be discarded for modeling compliance with the NAAQS and NMAAQS. PSD increment-consuming sources may not be discarded for PSD increment analysis. The table below describes when surrounding sources may be discarded.

Table 2: Surrounding Source Retention Criteria.

Between	And less than	Retain neighboring source if total emissions within 2.5 km of that source exceed:	
Facility	ROI + 10 km	Retain all sources	
ROI + 10 km	ROI + 20 km	24 lb/hr	105.12 ton/yr
ROI + 20 km	ROI + 30 km	53 lb/hr	232.14 ton/yr
ROI + 30 km	ROI + 40 km	86 lb/hr	376.68 ton/yr
ROI + 40 km	ROI + 50 km	119 lb/hr	521.22 ton/yr
ROI + 50 km	∞	Sources beyond ROI + 50 km may be discarded (Subject to 65 km minimum for PSD Increment consuming sources)	
100 km	∞	No sources past an absolute distance of 100 km from the facility need to be included, regardless of the size of the ROI.	
Facility	65 km	Retain all PSD increment consuming sources that are less than 65 km from the facility.	

6.2 Merging Stacks within a Facility

Caution: Merging stacks is recommended only for distant surrounding sources. Merging nearby sources can decrease model accuracy and increase predicted concentrations.

Sources emitting the same pollutant from multiple stacks within 100 meters of each other may be merged into one stack if stack height, flow rates, and stack gas exit temperatures differ by no more than 20% each. For each facility located more than 10 km past the radius of impact, all stacks at the facility may be considered as one stack, regardless of the differences in parameters and distance between stacks at the facility.

For each stack, compute a value for M (see equation below). Then use the parameters of the stack with the lowest value of M as the "merging" stack. Sum the emissions from all stacks to obtain an emission rate from the "merging" stack using the following equation:

$$M = \frac{HVT}{Q}$$

where:

H = stack height (m).
V = stack gas volume flow rate (m^3/s).
T = stack gas exit temperature (K).
Q = pollutant emission rate (g/s).

Reference: *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources*, Revised, EPA-450/R-92-019, October, 1992. U.S. Environmental Protection Agency, Office of Air and Radiation, Office of Air Quality Planning and Standards, Research Triangle Park, NC. http://www.epa.gov/scram001/guidance/guide/scrng.wpd